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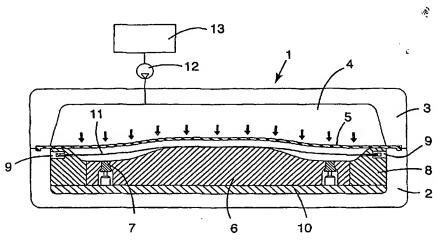
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(54) Title: FORMING TOOL



(57) Abstract: The invention relates to a forming tool for forming sheet blanks in a diaphragm press (1) of the kind comprising a openable, closed pressure chamber (4), which is divided in a gas and liquid tight manner by means of a flexible diaphragm (5). The forming tool (6) is adapted to be arranged on one side of the diaphragm and a sheet blank (11) to be formed is adapted to be arranged between the forming tool and the diaphragm. The opposite side of the diaphragm is adapted to be pressurised by a fluid being supplied at high pressure to cause the flexible diaphragm to deform and, thus, the sheet blank to be pressed against the forming tool. The forming tool (6) comprises an elongate cutting and flanging tool (7) along at least part of its periphery and/or around an intended opening in the sheet blank (11). The cutting and flanging tool (7) has a cutting edge and is displaceable, with the aid of actuating means, in an elongate slot in the forming tool towards and away from the plane of the diaphragm (5). At a first pressing pressure, the sheet blank is caused to be cut off against the cutting edge and, as the pressure is continuously increased, the cutting and flanging tool is caused to be displaced into the slot in the forming tool, so that the peripheral edge of the sheet blank is deformed towards the interior of the slot during forming of a flanged edge.

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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No

D,A	EP 0288705 A2 (ASEA BROWN BOVERI AB), 2 November 1988 (02.11.88), figure 3, abstract	1-5
A	DE 19951850 C1 (METALLWARENFABRIK REICHERTSHOFEN KARL BINDER GMBH), 25 January 2001 (25.01.01), column 3, line 57 - column 4, line 4, figure 5, abstract	1-6
A	US 6178796 B1 (KEIJO HELLGREN), 30 January 2001 (30.01.01), abstract	1-6
	 .	
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C (Continu	ation). DOCUMENTS CONSIDERED TO BE RELEVANT	<u></u> i	
Category*	Citation of document, with indication, where appropriate, of the relev	ant passages	Relevant to claim No
A	US 5649438 A (HERBERT L. HALL, JR. ET AL), 22 July 1997 (22.07.97), abstract		1-6
			
A	DATABASE WPI Week 198320 Derwent Publications Ltd., London, GB; Class P52, AN 1983-G7164K & SU 940930 B (AS USSR URALS POLYM), 07 July 1982 (1982-07-07) abstract		1-6
		,	



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	ent document in search report		Publication date		Patent family member(s)	Publication date
EP	0288705	A2	02/11/88	DE JP	3709181 A 1015230 A	29/09/88 19/01/89
DE	19951850	C1	25/01/01	NONE		
US	6178796	B1	30/01/01	AU CN CN EP TW US WO	4665299 A 1095705 B 1303324 T 1091815 A 472005 B 2001000413 A 9962652 A	20/12/99 11/12/02 11/07/01 18/04/01 00/00/00 26/04/01 09/12/99
US	5649438	A	22/07/97	AU WO ZA	2695295 A 9534389 A 9504934 A	05/01/96 21/12/95 14/05/96

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